



COLLAPSIBLE CONTAINER HAVING A CONTAINER  
BASE AND FOUR COLLAPSIBLE LATERAL WALLS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of International Patent Application No. PCT/EP/03/00006 filed on January 2, 2003, which claims the benefit of German Patent Application No. 102 00 070.0 filed on January 3, 2002.

FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] Not applicable.

REFERENCE TO A SEQUENCE LISTING

[0003] Not applicable.

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0004] The invention relates to a collapsible container according to the preamble of claim 1.

2. Description of the Prior Art

[0005] Collapsible containers of this type are widely used in trade because the containers can be reduced in size simply by folding the walls inwards on top of each other towards the base, while providing ample transport and receiving volume when the lateral walls are folded outwards into an upright position. Containers of this kind have a container base that is usually rectangular, to which are hinged the edges of the collapsible lateral walls, by articulated hinges or by integrally molded-on film hinges. When in the folded out or upright position, the lateral walls are interconnected by a snap-in catch, with

appropriate snap locks on one pair of opposing lateral walls engaging behind corresponding latches on the other pair of opposing lateral walls. However, releasing the catch on this type of collapsible container in order to convert the collapsible container from its service condition with upright lateral walls into the collapsed position with folded-down lateral walls is often problematic. Depending on the design of the collapsible container, folding the lateral walls upwards towards the snap-in catch in order to form the collapsible container is often awkward also, for those who are unfamiliar with the catch mechanism, it is frequently difficult to accomplish. Moreover, some containers give the impression of being very unstable when assembled, because the snap-in catch is not sturdy. Often, the lateral walls of the assembled container are not held firmly by the snap-in catches and therefore remain wobbly. When handled, these assembled collapsible containers are rickety and often collapse by accident, which is of course extremely annoying.

#### SUMMARY OF THE INVENTION

**[0006]** The object of the invention is to provide a collapsible container with lateral walls that can be folded upwards into an upright position, which ensures that the container's upright-folded lateral walls are interconnected by very sturdy snap-in catches and which permits simple releasing and locking of the lateral walls in their collapsed and upright-folded positions, especially for large collapsible containers.

**[0007]** According to the invention, the catch members are configured as pivoting locks mounted in opposing side walls. Each pivoting lock is expediently shaped as a circular-sector component and mounted on two opposite lateral walls. A pivoting lock of this kind immediately conveys to a non-specialist how to actuate the locking and

release mechanism, namely by appropriate rotary movement of the pivoting lock. It is also easy to convey this information visually to the user of the collapsible container, for example by means of an arrow painted on the pivoting lock or otherwise applied thereto.

**[0008]** The pivoting locks are preferably mounted on the short lateral walls of the container. When the lateral walls are to be collapsed, these short walls are folded towards the base first, and then the long lateral walls are folded down onto the collapsed short walls. The pivoting locks are conveniently mounted at the two upper edges of the short lateral walls, in particular at the two upper corner areas of the lateral walls.

**[0009]** Rotation of the pivoting lock is accomplished via a pivot pin which simultaneously serves as a connecting member for mounting the pivoting lock on the lateral wall.

**[0010]** To this end, the pivoting lock is configured with a pivot pin provided with latches. The pivot pin of the pivoting lock is engaged in a corresponding bushing in the lateral wall. In the engaged position, the pivoting lock can then be rotated about the axis of the pivot pin to unlatch the lateral wall for folding the wall towards the base. Of course, it is also possible to configure the pivot pin on the longer lateral wall with the bushing also mounted on the longest lateral walls.

**[0011]** The locking mechanism works via projecting locking tongues configured on the pivoting lock and engaging behind corresponding locating lugs located on the longest lateral walls, on the adjacent side of the corner. The pivoting lock is opened against a pretensioning spring, which, as the pivoting lock is opened, is pressed against a stop and thus pretensioned. When the pivoting lock is then released, the locking tongue extends again automatically and the pivoting lock moves into its rest position. Releasing

the lateral walls for folding purposes thus only necessitates manually rotating the pivoting lock, which is easily accomplished by gripping a grip member on the pivoting lock and swinging the grip member upwards; simultaneously with the rotary movement, the lateral walls can be collapsed inwards. According to another configuration or embodiment of the locking mechanism, the opening movement can also ensue by swinging the grip member sideways or downwards; here too, the lateral walls can be collapsed inwards substantially simultaneously. When the pivoting lock is thereafter released, the spring pretensioning force causes it to return to its starting or rest position, in which the locking tongues are extended. If the collapsible container is to be converted from its collapsed condition to its service condition with upright walls, it is merely necessary to fold the two long lateral walls upwards, followed by the two short lateral walls. The locking tongues are pressed in automatically when the ramp surfaces on the front of the locking tongues ascend the ramp surfaces located on the locating lugs, during this motion the springs become pretensioned. As soon as the locking tongues have moved behind the locating lugs, locking of all of the lateral walls ensues automatically. This is because the pivoting lock is rotated by the spring tensioning force that has built up, and the locking tongues are extended to engage behind the locating lugs. Suitable detent members are expediently attached to the lateral walls on the other side of the corner, resulting in a sturdy snap interlocking connection between the collapsible lateral walls, which accordingly do not wobble. The invention is characterized by very easy handling as far as releasing and locking the lateral walls in upright position, and it also guarantees very secure snap connections between the walls, which prevent wobbling of the lateral walls. Actuation, that is, opening and closing, of the collapsible container also ensues

automatically by appropriate actuation on the part of the user of the collapsible container, by gripping the pivoting locks and rotating them to release the locking tongues and in turn the lateral walls can then be collapsed inwards onto the base. To assemble the container in its service form, it is only necessary to fold the lateral walls upwards. Locking of the lateral walls to form sturdy, snap-in connections ensues automatically, without the need for manual operation of the pivoting locks, ascent ramps or the like.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

**[0012]** In the following, a preferred embodiment of the invention is described with reference to the drawings, which are purely schematic and intended as examples.

**[0013]** Fig. 1 shows a partial perspective view of the corner area of a collapsible container, and depicts the pivoting lock according to the invention;

**[0014]** Fig. 2 shows a perspective view of the pivoting lock as viewed from the inside of a container;

**[0015]** Fig. 3 shows an analogous perspective view of the pivoting lock of Fig. 2, but from the front side or outside of the container, which is visible from the exterior;

**[0016]** Fig. 4 shows a perspective view of the collapsible lateral wall, in which the pivoting lock of Figs. 2 and 3 is accommodated;

**[0017]** Fig. 5 shows a partial view of an adjacent collapsible lateral wall, on the other side of the corner, which serves as a detent for the lateral wall shown in Fig. 4.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

**[0018]** In the embodiment illustrated in the drawings, the pivoting lock is designated generally by the reference numeral 1. The pivoting lock member 1 is accommodated in a first collapsible lateral wall 2, which, in the embodiment illustrated, is one of the short lateral walls of a rectangular container made up of four collapsible lateral walls. Although not illustrated in the drawings, the collapsible lateral walls are hinged via suitable hinge joints or molded-on film hinges to the base of the container and can be folded inwards, one above the other. To do this, first the opposing short lateral walls 2 are folded inwards onto the container base, then the two long lateral walls, which are likewise opposite each other and are adjacent to the short lateral walls 2, are folded inwards, on top of the folded-down short lateral walls 2, onto the base. The second lateral walls, also referred to here as long lateral walls, are denoted by the reference numeral 3.

**[0019]** To accommodate the pivoting lock member 1, the first collapsible lateral wall 2 is provided with a corresponding complementary recess 4. This is especially apparent from Figure 4. When inserted into the recess 4, the pivoting lock member 1 is advantageously mounted within the recess 4 such that it is substantially flush with the short lateral wall 2 and does not project beyond the exterior surface thereof. For mounting, the pivoting lock member 1 is configured with a pivot pin 5 that has a latch 6 at its free end. In the embodiment illustrated, two opposing, flare-shaped latches 6 are provided. Via this pivot pin 5, the pivoting lock member 1 can be inserted and locked in a bushing 7 configured within the recess 4 in the first collapsible lateral wall 2. To accomplish the insertion of the pivoting lock member 1 into the complementary recess 4,

the pivot pin 5 is provided with a through radial slot 8, so that, when the pivot pin 5 is being inserted into the bushing 7, the pivot pin 5 can be pressed together to some extent. As soon as the latches 6 have been pushed through the bushing 7, the pivot pin 5 expands again on account of the elastic restoring forces. The pivoting lock member 1 is thus releasable by reversing this procedure, but is at the same time firmly and sturdily locked with the first collapsible lateral wall 2 in which it is nevertheless rotatably mounted.

[0020] As is apparent, the pivot pin 5/bushing 7 connection described here forms the pivot center for the pivoting lock member 1. As is best seen in Figures 2 and 3, the pivoting lock member 1 is configured as a circular-sector-shaped component, the center of which is formed by the centrally disposed pivot pin 5. For purposes of actuation, the pivoting lock member 1 is provided, behind a grip recess 9, with a grip member 10 within a grip ledge. The pivoting lock member 1 is additionally configured with a projecting locking tongue 11, which, in the locked position illustrated in Figure 1, engages behind a locating lug 12 on the adjacent long lateral wall 3 on the other side of the corner (see Fig. 5). As best seen in Figure 3 and Figure 5, both the projecting locking tongue 11 and the inwardly-projecting locating lug 12 on the adjacent long lateral wall 3 have an inclined ascent ramp or ramp surface 13 and 14 respectively, which have matching gradients. Locking ensues on account of two contacting surfaces, namely the surface X on the long lateral wall 3 (Fig. 5) and the surface Y on the pivoting lock member 1 or its projecting locking tongue 11 (Fig. 2). In the locked position illustrated in Figure 1, the pivoting lock member 1 is pretensioned by a pretensioning spring 15 which, in the embodiment described, is either molded integrally with the pivoting lock member 1 or is otherwise mounted thereon. In this embodiment, the pretensioning spring 15 is configured as an

arcuate flexible tongue. This pretensioning spring 15 interacts with a stop 16 on the first or short lateral wall 2. As shown in Fig. 4, this stop 16 is configured as a U-shaped molding which projects into the recess 4. Once again, the stop 16 is expediently molded integrally with the short lateral wall 2. When the pivoting lock member 1 is in the installed position, the free end of the pretensioning spring 15 abuts the stop 16. In the locked position, the two surfaces X and Y abut against each other, and the short and long lateral walls 2, 3 are held in the upright position. By opening the pivoting lock member 1, rotating it counterclockwise as shown in Figure 1 in direction of arrow 17 the two surfaces X and Y rotate away from each other to allow the short and long lateral walls 2, 3 to be collapsed. On account of its previously described pretension, the pretensioning spring 15 springs into its rest position. During closing of the short and long lateral walls 2, 3, the rotary movement is generated automatically by the ramp surfaces 14 and 13 by lifting the grip member 10 to move the projecting locking tongue 11 away from the locating lug 12. By way of the rotary movement one defines, so to speak, the position of a “surface,” as a result of which a form closure is created. To release the pivoting lock member 1 from the position illustrated in Fig. 1, the grip member 10 is rotated about the pivot pin 5 in the direction of arrow 17; as a result, the pretensioning spring 15 is tensioned against the stop 16. With this opening movement in the direction of arrow 17, the projecting locking tongue 11 is released from its locking position behind the locating lug 12, so that the first short lateral wall 2 can be collapsed inwards onto the base of the container. If one lets go of the grip member 10 here, the pivoting lock member 1 moves in the opposite direction to arrow 17, i.e., in the engaging position of the projecting locking tongue 11, because of the spring tension that has built up. This does not hinder



the opening movement, however, because the short lateral wall 2 has already collapsed down towards the base, and the projecting locking tongue 11 has already passed over the locating lug 12.

**[0021]** If the container is to be assembled again, the short and long lateral walls 2, 3 are snapped into locking position. The two short lateral walls 2 are folded upwards; shortly before the upright position, the ramp surfaces 13 of the projecting locking tongues 11 reach the inclined ascent ramp 14 of the respective locating lug 12, causing the pivoting lock member 1 to rotate automatically in the direction of arrow 17. As a result, the projecting locking tongues 11 pass behind the locating lugs 12 and then, on account of the spring tension, engage. This happens because while the projecting locking tongues 11 are ascending the locating lugs 12 via the ramp surfaces 13 and 14, the respective pivoting lock member 1 is swiveled in the direction of arrow 17, thereby pretensioning the pretensioning spring 15 so that, after passing over the locating lugs 12, the pivoting lock members 1, which are preferably mounted at the two upper edges, i.e., at the two upper corner areas of the two first, oppositely disposed short lateral walls 2, can be moved – thanks to the pretensioning spring 15 – into the snap-in position behind the locating lugs 12. This configuration ensures a very secure snap connection for the assembled short and long lateral walls 2, 3, these being snapped very easily into locking position by folding the opposing short lateral walls 2 into the upright position. The pivoting lock members 1 need not be actuated to do this.

**[0022]** To limit the movement of the pivoting lock member 1, an arcuate guide element 18, in the form of an oblong hole, is configured within the recess 4, into which guide element 18 a catch member 19 configured on the pivoting lock member 1 or

mounted thereon engages. The ends of the oblong guide element 18 thus limit the movement of the pivoting lock member 1.

**[0023]** The pivoting lock member 1 is expediently coupled with a safety catch that prevents the pivoting lock member 1 from opening and thus prevents the first collapsible lateral walls 2 from accidentally collapsing when several containers are in stacked position. The safety catch is expediently configured as an upwardly projecting locking pin 30 located on the upper edge of the pivoting lock member 1, approximately at the position indicated by 20, and in particular being configured integrally with the pivoting lock member 1. When the pivoting lock member 1 moves in the direction of arrow 17, thus releasing the locking mechanism, the locking pin 30 moves upwards out of a corresponding opening 32 at the upper edge of the first collapsible lateral wall 2. However, the movement of the locking pin 30 is blocked by the base of the container stacked above the container in question, so that the pivoting lock member 1 of a stacked container cannot be rotated in the direction of arrow 17 and thus opened.

**[0024]** In order to ensure that the assembled or upright short and long lateral walls 2, 3 are securely locked in position, the second lateral walls 3 are expediently provided with detent members against which the upright first collapsible lateral walls 2 abut. This arrangement prevents the latter from swinging further outwards. To this end, as is seen in Fig. 5, detent ridges 21 are configured immediately behind the locating lug 12. It is useful here if the detent ridge 21 has an opening 28, for example a slot, so that the position of the pivoting lock member 1 is apparent from the exterior. This is easier if the projecting locking tongue 11 has different colors. Additional detent members 22 and 23 with groove-like recesses 24 and 25 are configured at the upper and lower edges of the

long lateral wall 3. When the container is assembled, corresponding flexible elements 26 and 27 on the first short lateral wall 2 move into these groove-like recesses 24 and 25, thus ensuring sturdy and reliable snap-in connections between the upright short and long lateral walls 2, 3. This is of substantial importance for customer acceptance of collapsible containers of this kind.

[0025] The pivoting lock members 1 are expediently of integral configuration, being made, in particular, of plastic, and engaging as a single component in the complementary recess 4 in the first collapsible lateral wall 2. This facilitates both the production process and use. The advantage of the pivoting lock member 1 consists in that a catch mechanism is provided which is very easy to operate and which permits secure locking and releasing even of large containers, especially large containers measuring 60 x 80 cm and more. Just a single action and a single operation, namely gripping and rotating the pivoting lock member 1 using the grip member 10, are required to release and simultaneously collapse the short and long lateral walls 2, 3 in the direction of the base. The short and long lateral walls 2, 3 also engage automatically with each other when they are folded upwards to assemble the container, which is of substantial importance for customer acceptance of this catch mechanism and of the collapsible containers. This system simultaneously guarantees a very sturdy container configuration of upright, mutually engaged lateral walls.

[0026] What is claimed is: